

THE CATHOLIC DIOCESE OF KIGOMA
FORM FOUR PRE NATIONAL EXAMINATION FOR DIOCESAN SECONDARY SCHOOLS

CODE: 041

BASIC MATHEMATICS

Time: 3 Hours

22nd SEPTEMBER 2026 A.M

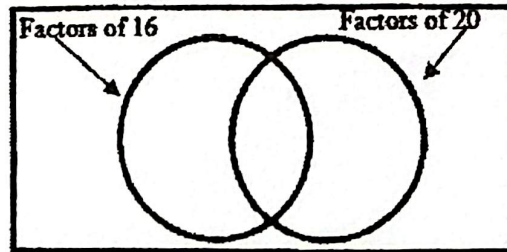
INSTRUCTIONS

1. This paper consists of sections A and section B with a total of 14 questions.
2. Attempt all questions in both sections.
3. Each question in section A carries 6 marks while each question in section B carries 10 marks.
4. Mathematical tables and non-programmable calculator may be used.
5. Write your examination number on every page of your answer sheets.

SECTION A (60 MARKS)

1. (a) Simplify where necessary then identify the number of significant figures in each of the following numbers:
 - i. 0.034500
 - ii. 69500 kg
 - iii. 40^2(b) Simplify then find the LCM and the GCF of the following numbers: $\sqrt{256}$, 2^5 and $(2 \times 2 \times 2 \times 3)$
2. (a) Solve: $\left(\frac{2}{3}\right)^4 \times \left(\frac{3}{2}\right)^6 \div \left(\frac{27}{8}\right)^4 = \left(\frac{2}{3}\right)^{(x+7)}$
(b) Evaluate $\log 0.125$ if $\log 2 = 0.3010$
3. (a) i. Copy and complete the Venn diagram to show the factors of 16 and 20

Figure 1



ii. Write down the highest common factors of 16 and 20.

(b) A ball is drawn at random from a box containing 6 red balls, 4 white balls, and 5 blue balls. Determine the probability that it is;

- (i) White
- (ii) Not red.

4. (a) A straight line passes through point $(4, 3)$ and is perpendicular to the line joining the points $(1, -1)$ and $(-1, 3)$. Find the equation of the line.

(b) Let $\underline{u}$ be the vector with initial point $(2, -5)$ and terminal point $(-1, 3)$. Find $2\underline{u} - 3\underline{v}$ given that $\underline{v} = 2\mathbf{i} - \mathbf{j}$

5. (a) Given the following figures

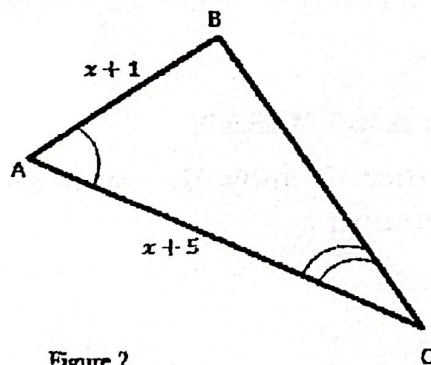
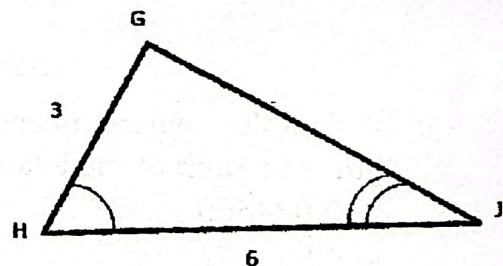


Figure 2



- i. Identify the similar triangles
- ii. Calculate x

(b) How Side – Side – Side (SSS) theorem used in proving congruence of polygons differ from Side – Side –Side (SSS) theorem used in proving similarity of polygons?

6. (a) The following table shows the value of y for some selected values of x . The variables x and y are connected by the relation " y varies inversely as x ". Calculate the missing values of y .

x	5			20
y		2	3	1.5

(b) A bus travels 480 km using 32 litres of diesel. How many kilometers will be covered by 20 litres of diesel? (Other things are constant).

7. (a) Mtakuja sold his old car at 12 000 000 shillings and got a loss of 25%. Find the original price of the car.

(b) From 1st January to 29th 2020, Mr. Mtakuja decided to keep records of his business as follows:

Jan 1 Mr. Mtakuja started a business with capital cash.....500,000/=

5	Sold goods	290, 000/=
6	Purchased good.....	245,000/=
10	Purchased good.....	204, 000/=
14	Expenses.....	24,000/=
29	Sold goods.....	320, 000/=

You're required to prepare:

- Trial balance
- Cash and capital account

8. (a) An arithmetic progression (A.P) consists of 50 terms of which the third term is 12 and the last term is 106. Find the 29th term.

(b) The second term of the geometric series is -30 and the sum of the first two terms is -15. Find the first term and the common ratio

9. (a) without using mathematical tables or calculator, find y from $y \cos 45^\circ + y \sin 45^\circ = 8$.
- (b) A rectangular field of 80 m long is to be fenced with a wire, if the diagonal of the field is 100 m long. Find the length of the wire needed to fence the field
- 10.(a) Factorize : $50 - 98t^2$
- (b) Solve: $ax^2 + bx + c = 0$ by completing the square then use the result to calculate x when $a = 1, b = -1, \text{ and } c = -2$

SECTION B (40 MARKS)

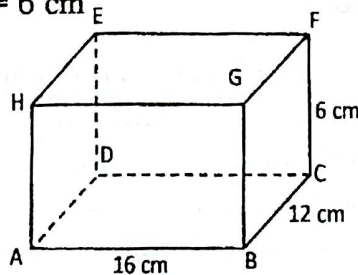
- 11.(a) The following are the scores of Geography test done by 72 students at Mtakuja secondary school as follows:

Marks in %	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	80 - 84	85 - 89
Number of students	7	6	$2x + 2$	3	19	9	$5x - 2$	7	3	4

Calculate the mean, median, and mode scores of the data.

- (b) Two circles with centres X and Y intersect at R and S. if $\overline{RS} = 24 \text{ cm}$, $\overline{XY} = 14 \text{ cm}$ and the radius of one circle is 15 cm, find the radius of the other circle.
- 12.(a) The speed of a boat travelling from point A ($6^\circ \text{N}, 33^\circ \text{E}$) to point B ($6^\circ \text{N}, 39^\circ \text{E}$) is 20 knots. After how many hours will it reach at point B? (Give the answer in whole number)
- (b) The following figure represents a cuboid ABCDEFGH in which AB = 16 cm and CF = 6 cm

Figure 3



- Name the projection of line BE on the plane $ABCD$
- Find length AF
- Calculate angle between AD and BF correct to 1 decimal place

- 13.(a) Find the image of the point Q (3, 2) after rotating through 270° clockwise about the origin
- (b) A translation takes the origin to (-6, 1), find where it takes (2, -5)
- (c) Mtakuja has 83 000 Tanzanian shillings for shopping. If he buys 2 ties and 2 shirts, he remains with 9 000 Tanzanian shillings. If he buys 1 tie and 3 shirts, he spends all the money. Find the price of a tie and a shirt by matrix method.
- 14.(a) Draw the graph of $f(x) = x^2 - x - 6$ and hence use it to solve the equation

$$x^2 - x - 12 = 0$$

- (b) Mtakuja has 10 acres of land on which he can grow either mangoes or oranges. He has 60 working days available during cultivation season. Mangoes require 5 days per acre of labour while oranges require 8 days of labour per acre. Net profit from mangoes per acre is 30 000 shillings and that of oranges is 45 000 shillings. How many acres of each crop should he plant to maximize his profit?